



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Cavaglia.

For: Oxygen Scavenging Compositions Having
Low Haze

Serial No. 10/523,650

Filed: 02/04/2005

) Docket No. CAVA3001/JEK
) Art Unit: 1711
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) Examiner:
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Commissioner for Patents
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DECLARATION OF VERNE R. RINEHART

I, Verne R. Rinehart, hereby declare that:

1. I am a resident of McArthur, Ohio and retired from The Goodyear Tire & Rubber Company. I am not an inventor of the subject matter disclosed or claimed in the subject patent application.
2. My educational background includes a Bachelor's Degree in Chemical Engineering and a Master's of Science in Chemical Engineering.
3. I am a named inventor in at least six (6) United States letters patents, all of which relate to the field of polyester polymers. Three of the patents relate to the solid phase polymerization of polyester resins.
4. I was employed by The Goodyear Tire & Rubber Company for approximately 34 years and have worked in the field of polyester resins for 29 years. My job function was primarily a research scientist in the field of polyester resins.

5. I am the sole inventor of United States Patent No. 4,876,326 (Rinehart) which is cited against the present application in the Office Action mailed 8/31/2007.

6. I have read the patents to Coover (US Patent No. 3,075,952) and Barkey (US Patent No. 3,497,477) cited in the Office Action. I understand their teachings and am familiar with the horizontal rotating, somewhat tilted horizontal rotating and vertical fluidized bed reactors described. Coover and Barkey use the somewhat tilted horizontal rotating reactor to solid phase polymerize polyester powders. I know this from Coover, (Col. 4, lines 18 – 35) describing the prepolymer as a powder and the sizes (Col. 4, lines 70 and 75) are consistent with powders. As noted in my invention, powders are not granules (pellets/chips) (Rinehart, Col. 1, line 32). One of ordinary skill in the art knows that due to channeling, powders need agitation and mixing, whereas granules (pellets) do not. (Rinehart, Col. 1, lines 65- 67 and Col. 2, line 9). One of ordinary skill in the art knows that a somewhat tilted horizontal rotating reactor provides mixing for powders as well.

7. I have read the Office Action mailed August 31, 2007 in which the combination to use the granules of my invention (Rinehart) in the somewhat tilted (from the horizontal) horizontal rotating reactor of Coover is proposed. For the reasons outlined below, I conclude that one of ordinary skill in the art would not combine the granules of my invention, as described in Rinehart, with a somewhat tilted horizontal rotating reactor as described in Coover.

8. The Office Action states that one of ordinary skill would combine the pellets/granules of my invention as described in Rinehart in the reactor of Coover to obtain effective mixing and the shortest pathway of outgoing gases through the polymer particles. I conclude that one of ordinary skill in the art of polyesters would not use the granules of my invention in the somewhat tilted horizontal reactor of Coover for the reasons cited in the Office Action because one of ordinary skill knows that the somewhat tilted horizontal rotating reactor of Coover does not operate in the manner described by the Examiner. This is particularly the case regarding how the somewhat tilted horizontal rotating reactor of Coover operates relative to the granules of my invention (Rinehart).

9. One of ordinary skill would not use the granules of my invention in a somewhat tilted horizontal rotating reactor for effective mixing. As described in my invention, the polymer form (e.g. pellet vs powder) determines the type of equipment used. (Rinehart, Col. 1, Lines

52 – 56). In my invention I used static bed processing described at Col. 10, lines 11-29. The primary reason static bed processing is used is to minimize the mixing in order to lower the generation of fines (powder) (Rinehart, Col. 10, line 28-29, noting that the polymer stays in the same physical form). The preferred process for the granules of my invention is the vertical tubular reactor as indicated by the uniform cross section. (Rinehart, Col. 10, Line 14) One of ordinary skill knows that because the cross section is uniform, no mixing is needed. One of ordinary skill prefers this type of reactor because it minimizes shear force as the granules only move via gravity (Rinehart, Col. 10, Lines 15 -21). One of ordinary skill in the art knows that the somewhat tilted horizontal rotating reactor has a lot of shear which generates more fines (powders). One of ordinary skill also knows that fines/powders raise the cost to process the resin and become high I.V. powders after solid phase polymerization, both of which render the processed difficult to process unless the fines are removed. (Rinehart, Col. Lines 11 – 15).

10. The Examiner's statement that the horizontal reactor has a shorter bed height for the gas to pass through the polymer mass incorrectly states how the somewhat tilted horizontal rotating reactor operates. The statement that the gas passes through the polymer does not agree with the teaching of Coover; nor does it agree with how one of ordinary skill understands how the somewhat tilted horizontal rotating or tubular reactor with a static bed operates. In the static bed tubular vertical reactor, the inert gas is passed homogeneously through the polymer bed flowing from the bottom to the top. (Rinehart, Col. 9, lines 28 – 38 and Col. 10, lines 11 – 21). The proposed combination does not slightly tilt my tubular reactor and rotate it, but starts with the horizontal reactor (Coover, Col. 2, line 52) and tilts it to make it a "somewhat tilted hollow" rotating reactor with a slight incline (Coover, Col. 3, lines 15-17). The proposed combination takes my vertical reactor of 90 degrees to the horizontal and make it "somewhat tilted" from the horizontal, an almost completely opposing design. Where I used a vertical reactor (90 degrees off the horizontal), the Examiner is proposing that one of ordinary skill would tip it almost 90 degrees to make it "somewhat tilted". I can think of no reason why one of ordinary skill would make this dramatic modification and as noted in this Declaration, there are many reasons why one of ordinary skill in the art would not make the proposed combination.

11. One of ordinary skill knows that the inert gas does not pass through the polymer bed of a somewhat tilted horizontal rotating reactor, but passes over the bed. This is because the gas

is introduced in the lower end and flows countercurrent to the flow of the polymer and the reactor is only slightly tilted. This is explained in Coover in several places. This is the reason that Coover teaches that any polymer more than 5 mm below the surface be agitated to come into contact with the gas. (Coover, Column 2, line 32 – 33). Note also that Coover states that in the horizontal reactor, the gas is passed over the bed, not through the bed, as stated in the Office Action. (Coover, Col. 4, Lines 53 – 54). Therefore one of ordinary skill would not use a somewhat tilted horizontal rotating reactor if he or she desired the gas to pass through the particle bed. Rather one of ordinary skill would use the vertical tubular reactor if one wanted the gas to pass through the bed. It is noted that Coover does describe gas passing through the polymer bed, but one of ordinary skill knows that to be in the vertical fluidized reactor described at Col. 5, lines 8 – 9, not the slightly tilted rotating horizontal reactor. See also Rinehart (Col. 2, line 1) for reasons why one would not process chips or pellets in a fluidized bed.

12. One of ordinary skill in the art would not combine the granules of my invention (Rinehart) in the somewhat tilted horizontal rotating reactor of Coover because the combination eliminates the advantages of my invention. As evidenced in Coover and Barkey, at the time of my invention, it was well known to process powders in somewhat tilted horizontal rotating reactors. Rotating reactors of any type are not preferred for pellets. It is well known to one of ordinary skill that the somewhat tilted horizontal rotating reactor has inherent shear agitation and grinding. Therefore, one of ordinary skill in the art knows that processing pellets in rotating reactors produces a large amount of fines. The reason the somewhat tilted horizontal reactor is used to process powders is because powders are already fines and the generation of fines due to the grinding action of the somewhat tilted horizontal rotating reactor is immaterial. At the time of my invention, one of ordinary skill knew that powders had a high surface area and solid phase polymerized very quickly. Powders could not be solid phase polymerized in static beds as described earlier. My invention created a pellet/granule made from agglomerated powders and kept in that form, which provided the solid phase polymerization rate of a powder due to its higher surface area that could be processed in pellet processing equipment. (Rinehart, Col.2, line 27 and lines 32 – 39). One of ordinary skill knows that the whole point of my invention was to avoid the powder type processing equipment. Processing the compacted pellet/granule of my invention in the somewhat tilted horizontal rotating reactor used to process powders eliminates the advantages of my invention – processing in pellet type equipment. Therefore, using my granules in a

somewhat tilted horizontal rotating reactor used in powder processing is inapposite to what my invention teaches and advances.

13. I also conclude that one of ordinary skill in the art would not process the porous granule (pill) of my invention in a somewhat tilted horizontal rotating reactor due to the generation of polyester powder during processing (fines). Since the porous pill is by definition an agglomeration of compacted powder or small fibers, one of ordinary skill knows or would immediately observe that shear forces readily reduce the granule back to its original powder form. After making and handling the porous pellet prior to solid phase polymerization it was readily discernible to me and one of ordinary skill that minimal or no agitation should be used, hence my use of the static bed vertical tubular reactor. The agitation and grinding from the somewhat tilted horizontal rotating reactor would destroy the porous pellet and regenerate a large amount of powder. The primary goal of the porous pellet was to avoid powders (Rinehart, Col. 2, line 27 and lines 32 – 39) and the use of the slightly tilted horizontal rotating reactor merely generates powders which would destroy the purpose of my invention. While my invention lists fixed bed, static bed, fluidized bed, or a moving bed, some of which have small amounts of agitation (Rinehart, Col. 10, lines 9 -10), it is well known that the somewhat tilted horizontal rotating horizontal reactor has much greater agitation and grinding motion than those techniques and that one of ordinary skill would avoid a horizontal rotating reactor and not seek it out as suggested in the Office Action.

14. Another reason one of ordinary skill in the art would not combine my invention (Rinehart) with the slightly tilted horizontal rotating reactor of Coover is because Coover teaches that the non-frangible particles are to be avoided (Coover, Col. 5, lines 30 – 40). This is mutually exclusive with my invention. My invention (Rinehart) teaches that the powder is to be compacted (agglomerated) into a non-frangible particle so it can be processed as a pellet, while Coover teaches that any powder agglomeration is to be frangible. One of ordinary skill cannot use a non-frangible powder compacted into a pellet in a process which requires that the powder remain a powder.

15. I declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the U.S.

Code and that such willful false statements may jeopardize the validity of this application and any patent issuing thereon.

Respectfully submitted,

Verne Rinehart

October ____, 2007

Verne R. Rinehart

11-19-07